

# Clue Awareness During Searches

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One of the most important skills that a member of a wilderness search and rescue field team can possess is clue awareness. Often on searches, the lost person finds a search team and everyone goes home happy. But, occasionally, the subject doesn't conveniently walk into a field team. With a mobile or medically impaired subject, several square miles of rugged terrain to search, and limited search resources, it is important that proper search techniques be used by clue aware searchers during search operations.

A major component of clue awareness is the realization that we are all track erasers and have the potential to both add to the confusing clutter of non-relevant clues and for destroying clues that we may miss but another searcher coming through the area later would have been able to detect. For this reason, it is very important that field team members have a minimum impact on the environment that they move through. As much as possible, they stay off obvious tracks and other clues, off the soft dirt parts of trails where tracks can easily be picked up, and walk in the lead member's footprints to both reduce the chance of inadvertently destroying a clue and, also, to limit the number of non-relevant clues that the field team leaves behind.

There are many types of clues encountered during a search. The ultimate clue is the subject, but anything that the subject leaves behind in passing through an area is also a clue. The absence of clues in a given area is also informative in that it suggests, in the form of a probability, that the subject did not pass through the area. Clues themselves include, but are not limited to, articles of clothing or equipment, tissue paper, food or beverage wrappers, fire pits, crushed grass where a subject slept or walked, blood or scrape marks on a hill side or cliff where a subject fell, and tracks or altered condition of vegetation caused by the subject walking through an area.

On almost all searches there are thousands of clues left by the subject. Most of these take the form of track fragments left by the subject while walking. An average stride length is about 18 to 20 inches long, resulting in over 3000 steps taken for each mile of travel, an abundance of clues waiting for the alert, clue aware searcher to find.

The evaluation of clues is complicated by other people and animals that also disrupt the environment and leave clues during their passage through the search area. Clues associated with the subject are relevant clues; those clues not associated with the subject are non-relevant clues. Any clue that **may** be associated with the subject has to be considered relevant.

A high priority should be given to establishing some criteria for evaluating the clues, so that ones obviously not associated with the subject can be ignored by the field teams (though even non-relevant clues must be preserved because they may become relevant clues as more information about the

subject becomes available). For footprints, knowing the length and width of the shoe or boot worn by the subject will often help eliminate a lot of non-relevant clues.

Detecting clues involves observing disturbances to the natural environment. In the urban environment that most search and rescue members live, the objects that we see are usually delineated by consistent surfaces, often sharp lines, and become very obvious because of bright, conflicting colors. We don't need to think very much about what we are looking at because the objects themselves and the borders separating them are very conspicuous.

In nature, the colors are subtle and blend together, with uneven boundaries between objects. So, the way that we have conditioned ourselves to observe the world around us will generally work against us in looking for clues in the natural environment most typical of searches. The clues that we seek will appear as disturbances to the natural environment.

The two basic tenets of an effective tracker are to not advance beyond the last print until the next one is found and to not destroy clues. To effectively search a wilderness area, it is important for search team members to be clue aware. The subject leaves thousands of clues, primarily in the form of partial and full footprints, during their travel through an area. It is much more likely for a search team to encounter clues rather than the subject. Following these clues, the team will then be able to locate the subject.

Because the majority of the clues are footprints, it is very important for the field teams to have information on the length, width, and, if possible, sole pattern of the subject's footgear. Any information that would help to uniquely associate the subject with clues found (for example, the subject walks on his toes or has a dog with him) will help the field team separate relevant from non-relevant clues or, at least, assign a degree of confidence to conflicting clues found. This will allow the teams to concentrate on a subset of the total number of prints that they encounter.

Clue detection involves both knowing how to look for clues and how to interpret what is seen. Clues are disturbances to the natural environment caused by the subject passing through the area. Detection of clues requires the use of visual skills of the observer. Light is used to make the clues observable. To maximize the observer's visual acuity, it is important to optimize the lighting conditions based upon the available resources.

It is generally easiest to detect clues by visually scanning the ground while facing the light and with the light source at a low angle to the ground. This often means that a tracking team member moves around to face the light source, but it must be done carefully, so that, clues are not destroyed. It is also sometimes helpful to turn around and look back while tracking, to view a different perspective of the scene.

After a long period of examining an area in small detail and not finding a clue that should be there (the print from the next step, for example), it may be helpful to stand up and re-focus attention on the large scene for a few minutes, then, return to the detailed examination of a small region where the next clue is expected to be found.

If the sun is the source of the light, it is usually easiest to detect clues (track) when the sun is at a low angle to the horizon, that is, in the early morning or late afternoon. If the sun is high in the sky, that is, the time is close to noon, a good light angle can be created by shadowing (with a hat or body) the region being visually scanned and redirecting the light from the sun by reflection from a mirror. If the observer is in a diffused light situation (for example, under a canopy of trees or under cloud cover) a flashlight can sometimes bring out details of clues.

At night, an observer can control the light angle. A low light angle is usually best for detecting clues. A diffuse light source, such as a lantern or fluorescent light with the light source shielded from the observer's eyes, generally works better than a focused beam (such as a 4 D-cell MagLight) because the diffused light brings out subtle signs better, doesn't effect night vision of the observer as much,

and the diffused light spreads out more, which will allow the observer to detect sign in the periphery of their vision. A benefit of night tracking is that the darkness hides many of the distractions that surround the scene during the daytime, allowing the searchers to focus their attention on the limited area of interest.

In searches for a person, we are looking for clues or signs that indicate the subject's passage through an area. A typical walker will take about 3000 steps per mile, so there is an abundant potential for clues to be left in an area traversed by the subject.

Most of the clues available are disturbances in the natural environment, primarily fragments of footprints. Rather than have a preconceived notion of what they are looking for (for example, a footprint), skilled trackers use anomalous characteristics of the environment (as they view it) to guide them to the clues, or signs, that they are seeking. This allows them to consciously eliminate information deemed non-relevant, rather than unconsciously not mentally processing important clues because they don't fit the preconceived notion of what is being looked for.

In nature, colors are generally bland, and borders and surfaces are uneven. A skilled tracker looks at a feature's outline, color, texture, shape, and contrast with the surrounding environment. Features that seem out of place are clues that indicate a possible disturbance made by a person passing through the area. Initially, the ground is scanned from a large scale, then from a closer view. Anything that appears out of place or unusual is examined in detail. Everything is carefully examined and that which is determined to be non-relevant is consciously eliminated. The searcher is looking for parts, not the whole; only infrequently will a perfect footprint be encountered.

It is important that as much information as possible be established about the foot gear of the subject. Length, width, heel dimensions, sole pattern and pattern dimensions, wear patterns, and distance between consecutive steps (stride) are all very important characteristics that will help to eliminate many non-relevant prints and partial prints that are found. Drawing a print will help bring out details that otherwise might not be noticed and it also can be copied for other search teams.

When information about a print is communicated to the CP or another team, the person sending the information should request that the receiver of the print information describe it back. This will allow the team at the print to clear up any misconceptions on the track characteristics that might be held by the CP or team receiving the print information.

There are several possible sources of information about the subject's print. A good, high probability print may have been left by the subject near the door of the vehicle they left at a trailhead or in the area of a location that the subject was known to have been, such as, a gate or camp site. Since there are often conflicting, multiple prints found, it is important to accumulate as much reliable information as possible about the print, or other aspects associated with the search subject (such as, a dog with them), and correlate the prints and other clues found with the known information.

A reliable source of information on the length of the subject's print can often be obtained from a measurement of the length of a pair of shoes or boots that the subject left at home or in the car. This will not give a print pattern, but it will provide guidelines (within an inch or so) on the length of the subject's footprint. It is preferable to actually measure a pair of the subject's shoes rather than trying to establish a length from a shoe size because lengths for a size often vary between manufacturers and models.

Disturbances left by a subject's passage through an area include discarded material, footprint fragments, broken and bruised vegetation, grains of sand on the underside of leaves and grass blades, dislodged or crushed stones or dirt chunks, dirt prints on an asphalt road, or a flattening of a surface area. The characteristics of these disturbances will change with time and are also effected by weather, terrain, time of day, and the passage of other people and animals through the area.

A good tracker does not have a preconceived notion of what form a clue will take. Anything that seems unusual for the environment (for example, a geometric pattern in loose dirt or a creased leaf) should be examined closely and in detail. It is important to be patient and look at everything. Clues are generally parts of the whole, for example, a partial arc of a boot heel or a broken twig. By following the partial prints and bent blades of grass, step by step, eventually a good (near full) print will be found.

Different environments will show clues in different ways. When examining a material for clues, think about how a person would leave a clue in the material, as opposed to clues left in the material by an animal or occurring through some other natural means.

For example, footprints left by people tend to be flat, oblong (the foot's shape), and larger than prints left by animals. The flattening will often appear as shine, reflecting light differently than the natural material. Shine frequently is easiest to see looking towards the light source at a distance from the area of shine and with the light source at a low angle. Shine will often be noticed on flat, hard ground that otherwise does not reveal clues.

Prints of hoofed animals (deer, horses, and cattle) will flatten an area, but their prints are smaller and deeper than a human's, and the prints will have a distinct edge. Animals with soft paws will generally not push pebbles and twigs into the ground unless the ground is soft enough to also reveal the full paw print. The majority of partial prints left by a human are heel strikes and toe digs. Examining toe digs will also provide an indication of the direction of travel. Print fragments are easiest to detect in loose or slightly wet soil. Trails, including game trails, will frequently present the best locations to find tracks.

A human or animal stepping on grass or vegetation will push it down, causing it to reflect light differently than it did in the undisturbed state. A human print is longer than an animal's and tends to push the grass down, while a hoofed animal will tend to crimp the blades of grass. This crimping will also occur in leaves stepped on by a hoofed animal. Vegetation that is stepped on by a human or hoofed animal will tend to be damaged through bruising, creasing, or crimping, and, even though the vegetation may quickly spring back up, the scars from the injuries last much longer and the injured area heals at a predictable rate.

A person moving over ground and through vegetation will cause several types of noticeable disturbances to the surroundings. Twigs, pebbles, and rocks will settle into the ground over time. A human or animal can easily dislodge the object, leaving the depression caused by the object settling into the ground. These dislodged objects will usually become dislodged in the direction of travel.

Healthy plants generally don't drop their leaves or pedicels, but, a human or animal pushing through the vegetation could dislodge the green leaves or plant pedicels. Dried leaves can be expected to fall on their own. Creasing, bruising, or crimping also may be evident in leaves, flowers, or grass blades on the ground. A person or animal moving through vegetation will frequently break small twigs and branches, and the direction of bend will indicate the travel direction.

If a dry twig is stepped on, it will often break. If a hoofed animal steps on a dry twig, it will generally cause the twig to splinter. Healthy leaves and grass blades that are stepped on will often turn over, revealing a lighter color underside. Also, small pebbles or grains of sand may be pushed into the soft leaf or grass. Bruising will be more apparent on the lighter side of a leaf or grass blade. Because small bushes and plants generally grow close together, their branches will often be intertwined. A person or animal walking through the vegetation will pull the branches apart. The direction of pull will indicate the direction of travel and the height of the disturbance will indicate the size of the disturber.

Clue detection and tracking skills are improved with practice. One way that searchers can practice tracking and clue detection almost every day is to integrate a tracking/clue detection scenario into their daily workout schedule. This can be accomplished by including running or walking on dirt roads or trails into the workout, with occasional short segments in different types of nearby ground cover, and wearing different shoes on alternate days. During the workout, the tracks from the previous day,

or two days before, are followed and identified. This will train the searcher to be more alert to track fragments and disturbances to the natural environment, and also to recognize the effects of time on track erosion in dirt and on bruised vegetation.

At 3:00 AM on a cold, wet morning, exhausted from several hours of futile searching, and with the night chill and tiredness setting in, it is very easy for searchers to become careless by destroying clues, needlessly adding to the non-relevant clue clutter, or missing obvious clues that would quickly lead them to the subject. At these times, it is very important that team members remind each other to not be track erasers, to continue to be alert for print fragments and other clues, and to actively search for the subject (call out their name and look into any nearby location that an unresponsive subject may be).

A typical lost/missing person leaves behind thousands of clues, primarily in the form of print fragments, for the clue aware searcher to find. But, there are many other types of clues that can be detected and each environment encountered must be examined for the specific ways that clues will appear in the vegetation, soil, or rocks of that environment. The clues will appear as disturbances to the natural characteristics of the environment. Taken together, these clues will lead a patient, clue aware tracker to the subject.